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INTRODUCTION.

The meteorological conditions which prevailed over the United States during October, 1883, as compiled from the reports from the Signal Service and voluntary observers, and from the monthly reports of state weather services, are shown in this REVIEW.

Descriptions of the storms which occurred over the north Atlantic ocean are also given, and their approximate paths shown on chart ii.

On chart i. are shown the paths of nine atmospheric depressions, which are described under "areas of low barometer."

The mean temperature of October has been greater than the normal in the south Atlantic and Gulf states, while in all other parts of the United States it has been below the normal.

The monthly precipitation has exceeded the average for October over the greater part of the country, the exceptions being the Rio Grande valley, lake region, south Atlantic and east Gulf states, and the north Pacific coast region, where deficiencies have occurred.

The weather over the north Atlantic ocean was generally stormy, being attended by a succession of strong westerly breezes. The depressions charted did not exhibit more storm energy than is usual in October.

In the preparation of this REVIEW the following data, received up to November 20th, have been used, viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-two Signal Service stations and twelve Canadian stations, as telegraphed to this office; one hundred and fifty-nine monthly journals, and one hundred and forty monthly means from the former, and twelve monthly means from the latter; two hundred and forty-two monthly registers from voluntary observers; fifty-two monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Indiana, Iowa, Kansas, Nebraska, Ohio, and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for the month of October, 1883, determined from the tri-daily observations of the Signal Service, is shown by the isobarometric lines on chart iii. An area of barometric maxima inclosed by the isobar of 30.15, extends from southern New England to Virginia, where the mean pressures vary from 30.15 to 30.19. From this region the mean pressures decrease to 30.1 over the maritime provinces of Canada; to 29.98 at Key West, Florida; and to 29.88 in Arizona, where a small area of barometric minima is inclosed by the isobar of 29.9. The isobar of 30.05 is traced from Washington Territory in an irregular line southeastward to the mouth of the Mississippi river. East of this line the monthly barometric means increase gradually to the region of greatest pressure on the Atlantic coast, while to the westward a corresponding decrease is shown, the pressure being least in Arizona.

Compared with the mean pressure of the preceding month (September), there has been a slight decrease in the northern and middle slopes, upper Missouri valley, and in the west Gulf states. In all other districts the mean pressure has been greater, the increase being most marked in New England and the Canadian maritime provinces where it varies from .10 to .15. On the Pacific coast the increase ranges from .06 to .10 in California, and from .01 to .07 in Washington Territory and Oregon.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

The mean pressure of October, 1883, compared with the normal of the corresponding month shows slight deficiencies in the southern states, in the Rocky mountain region, and on the Pacific coast. Over the northern districts east of the Missouri valley the mean pressure is above the normal, the departures being greatest in the upper Missouri valley, upper lake region, and New England, where they range from .08 to .11.

BAROMETRIC RANGES.

The monthly barometric ranges have been greatest from Dakota eastward to New England, where they have varied from 1.22 to 1.59; they have been least on the eastern Gulf coast, in Florida, and Arizona, the smallest range, 0.33, being reported from Cedar Keys and Key West, Florida.

In the several districts the monthly ranges have varied as follows:

New England.—From 1.16 on the summit of Mount Washington, New Hampshire, to 1.59 at Eastport, Maine.

Middle Atlantic states.—From 0.92 at Norfolk, Virginia, to 1.45 at Albany, New York.

South Atlantic states.—From 0.37 at Jacksonville, Florida, to 0.88 at Kitty Hawk, North Carolina.

Florida.—From 0.33 at Cedar Keys and Key West, to 0.36 at Sanford.

Eastern Gulf.—From 0.37 at Pensacola, Florida, and Mobile, Alabama, to 0.58 at Vicksburg, Mississippi.

Western Gulf.—From 0.51 at Galveston, Texas, to 0.88 at Fort Smith, Arkansas.

Rio Grande valley.—From 0.50 at Brownsville, Texas, to 0.55 at Rio Grande City, Texas.

Tennessee.—From 0.67 at Chattanooga, to 0.71 at Memphis and Nashville.

Ohio valley.—From 0.94 at Louisville, Kentucky, to 1.18 at Pittsburg, Pennsylvania.

Lower lakes.—From 1.23 at Toledo, Ohio, to 1.49 at Oswego, New York.

Upper lakes.—From 1.14 at Chicago, Illinois, to 1.42 at Port Huron, Michigan.

Extreme northwest.—From 0.98 at Fort Buford, Dakota, to 1.32 at Moorhead and Saint Vincent, Minnesota.

Upper Mississippi valley.—From 0.84 at Cairo, Illinois, to 1.16 at Saint Paul, Minnesota.

Northern slope.—From 0.76 at Cheyenne, Wyoming, to 0.97 at Fort Shaw, Montana.

Middle slope.—From 0.65 on the summit of Pike's Peak, Colorado, to 0.94 at West Las Animas, Colorado.

Southern slope.—From 0.59 at Fort Davis, Texas, to 0.70 at Fort Stockton, Texas.

Southern plateau.—From 0.41 at Fort Grant, Arizona, to 0.64 at El Paso, Texas.

Middle plateau.—0.74 at Salt Lake City, Utah.

Northern plateau.—From 0.91 at Dayton, Washington Territory, to 0.97 at Lewiston, Idaho.

North Pacific.—From 0.78 at Roseburg, Oregon, to 1.05 at Fort Canby, Washington Territory.

Middle Pacific.—From 0.61 at San Francisco, California, to 0.68 at Sacramento and Red Bluff, California.

South Pacific.—From 0.45 at San Diego, California, to 0.64 at Yuma, Arizona.

AREAS OF HIGH BAROMETER.

Five areas of high barometer have been traced during the month. Three of these made their appearance on the Pacific coast. Each area was well defined and extensive. The movement of number ii. is interesting; first appearing in southern California, thence moving northward along the Pacific coast, passing into the British Territory and disappearing from the chart, and again appearing in the vicinity of the upper lake region.

I.—The morning report of the 1st showed the pressure to be increasing slightly at stations in the Saskatchewan valley and in Montana. During the day it continued to increase, the area extending southeasterly. On the 2d the centre of area was over the Missouri valley. On the 3d, over the upper lake region, while the area covered all districts east of the Rocky mountains. The centre moved slowly eastward over the lower lake region, the northern portion of the middle Atlantic states and New England, and the entire area disappeared into the Atlantic on the 6th. Killing frosts occurred during its progress at a few stations in the upper Mississippi valley, lake region, and New England.

II.—After the passage of low area number ii. the pressure generally increased in southern California, and slowly extended along the Pacific coast on the 4th, following the low area before mentioned. From the 5th to the 9th the pressure constantly increased over Oregon and Washington Territory, and on the latter date the centre of area came within limits of observation and was located in British Columbia. In Montana the barometer stood .41 of an inch above the normal. Following the course of the storm the area disappeared from the chart on the 12th, having passed into British America. During the 12th its course was altered, and on the morning of 13th the southern limits reappeared in the vicinity of Manitoba. During the 13th the area extended rapidly over the upper lake region and upper Mississippi valley, and on the 14th the pressure was greatest near Lake Superior. On the morning of the 15th the pressure was above the normal in all districts east of the Rocky mountains, being greatest at Marquette, Michigan, where the barometer stood .60 of an inch above the normal. After its reappearance the area moved in a direction a little south of east over the British Provinces and New England, and passed off into the Atlantic on the 18th. Frosts occurred as far south as northern Virginia, and high winds prevailed on the Atlantic coast during its passage. The area was very extensive, covering at one time nearly the entire chart.

III.—This area made its appearance on the Pacific coast on the 17th, and the pressure increased considerably as the area moved eastwardly over Oregon and Washington Territory. At midnight of the 18th it was central in northern Montana. The morning report of the 19th showed it to be central north of Dakota. At midnight of the 19th the area covered all districts west of those bordering on the Atlantic. On the morning of the 20th the pressure was greatest near Lake Superior, being .63 of an inch above the normal, and on the 21st the centre was north of Lake Ontario. This area moved in an easterly direction, passing over the St. Lawrence valley and New England and disappeared beyond limits of chart on the 22d.

IV.—On the 22d, while high area number ii. was disappearing off the Atlantic coast, the pressure in Montana began steadily to increase. The area moved easterly and on the 23d the centre was over Manitoba. On the 24th the greatest pressure was near Lake Superior, but the area had extended as a narrow ridge from Lake Superior to Texas. At this time low area number viii. was developing in Arkansas. The pressure in Texas and the Missouri valley rapidly increased, causing a norther on the 25th in Texas, the Indian Territory, and Kansas, with frosts. During the 25th and 26th the area was slowly dissipated.

V.—This area made its appearance in California on the 28th, moving in a northerly direction along the coast. On the 29th it covered all territory west of the Mississippi river. On the morning of the 30th it was central over Washington Territory. The midnight report of the 30th showed the pressure to be greatest in Montana, and from thence it moved southeasterly. At midnight of the 31st it was central in the Missouri valley, the pressure being .44 of an inch above the normal. This area was very extensive, and its movement in connection with low area number ix. caused severe gales on the lakes and the Atlantic coast. Its further description will be found in the REVIEW for November.

AREAS OF LOW BAROMETER.

Nine areas of low barometer have been charted during the month, and, with one exception, viz., number ii., they developed within the limits of observation and uniformly pursued a northeasterly course. Numbers v., vii., and ix. developed in the Mississippi valley. Number iii. formed in Arizona on the 6th, and moving rapidly northeastward united with number iv. east of Manitoba on the 8th, the latter developing in western Dakota contemporaneously with the development of number iii. in Arizona. Number i. increased in energy as it approached the Atlantic, causing severe gales on the coasts of New England and New Jersey.

Dangerous gales occurred on the upper lakes during the passage of number vi., and number ix. was very severe on the lower lakes. From the 21st to the 25th the reports from stations on the Atlantic coast gave evidence of the presence at sea of a severe storm. Very high northerly winds prevailed, with general rains. The centre of disturbance did not at any time approach sufficiently near the coast to be even approximately located and path of storm determined. Its description will be found in chapter on north Atlantic storms.

The following table shows the latitudes and longitudes in which each depression was first and last observed, and the average hourly velocity of each depression within the limits of observation:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I.	37 15	104 00	44 00	59 30	50.0
II.	32 30	112 30	48 15	119 00	42.5
III.	33 30	111 30	51 00	93 00	49.2
IV.	47 00	102 00	51 00	93 00	16.7
V.	46 00	92 00	50 00	72 00	31.3
VI.	39 00	86 00	47 30	62 00	55.2
VII.	32 00	112 30	50 00	95 00	29.0
VIII.	34 00	91 30	43 00	62 15	26.6
IX.	39 00	91 30	50 00	61 00	35.4

Mean hourly velocity, 37.3 miles.

I.—This area developed in southern Colorado on the morning of the 1st. During the day rain fell in the Missouri, Mississippi and Ohio valleys, and in Tennessee, and, by the morning of the 2d, in the lake region, at which time the area was central in Ohio, having moved with great rapidity in an easterly direction from Colorado. As it approached the Atlantic during the afternoon of the 2d it increased in energy, causing severe gales on the coasts of New England and New Jersey, and general rains. At midnight of the 2d the centre was off southern

Nova Scotia, and on the morning of the 3d off Cape Breton island. Its movement of translation was about sixty miles an hour. The lowest barometer observed was 29.39 inches at Block Island, Rhode Island, and New Haven, Connecticut, on the 2d.

II.—The following appeared in the "New York Herald" of October 15th, and are the only data received beyond the stations of observation, relative to the movement of this disturbance:

PANAMA, Oct. 6.—The Pacific Mail steamship "San Blas," Captain Chapman, on her last voyage to this port from San Francisco, encountered a cyclone off Cape Corrientes. The barometer commenced to fall at about six o'clock p. m., on September 22d, and went down to 28.85. When the indications denoted that the vessel was running toward the edge of a cyclone, she was headed away and finally brought to with her head southward and engines going slowly. The wind blew with hurricane force, accompanied by terrific rain squalls with a fearful cross sea, the lee main rail being in the water, although none came in from the windward. The data obtainable from the shift of the wind and the average fall of the barometer, lead Captain Chapman to estimate the diameter of the cyclone at about two hundred miles and its track at nearly northwest. Its rate of progression was about fifteen miles an hour, and the distance between the ship and the focus, when passing each other, about seventy miles.

From the track of low area number ii. as charted, there appears no reason to doubt but that it is the same disturbance encountered by the "San Blas." Captain Chapman stated the hurricane was moving to the northwest. Yuma, Arizona Territory, where this area made its appearance, lies in a direction about north-northwest from Cape Corrientes. The distance of the centre of storm from the vessel was estimated as about seventy miles. It is not known how far the vessel was from the shore, but presumed less than thirty miles, and such being the case, the centre must have been over the land. While the data obtained are not sufficient to determine the earlier movements of this disturbance, the above facts would seem to indicate that it approached Mexico from the eastern coast, probably from the Carribean sea and moved over the land in a northwesterly direction, following the parabolic path usual with these storms, and after reaching Cape Corrientes diminished considerably in energy and entered Arizona Territory a weak depression. After its appearance at midnight of the 2d it continued in a northwesterly course until the afternoon of the 3d, at which time it was central north of Sacramento, California. From this point it recurved and moved northeasterly, passing into British America on the 4th.

III.—This depression developed in Arizona on the evening of the 6th. The midnight report of that date showed the pressure to be below the normal in the territory between the Missouri river and Sierra Nevada mountains, the greatest departures being in western Dakota and Arizona. The depression in Arizona moved rapidly northeastward. At midnight of the 7th the centre was near Yankton, Dakota, and on the morning of the 8th it united with low area number iv. east of Manitoba. Rain fell in the Missouri and upper Mississippi valleys and upper lake region during passage of storm.

IV.—The development of this area has been mentioned in description of number iii. After its formation at midnight of the 6th, it moved slowly northeastward from western Dakota until it united with number iii. on the 8th, after which the combined areas moved with greater rapidity, passing into British America beyond the limits of observation.

V.—After the disappearance of numbers iii. and iv., a secondary depression formed near Saint Paul, Minnesota, during the afternoon of the 8th. Light rains had fallen in the northern portions of the upper lake region, and strong southerly winds prevailed on the lakes. On the morning of the 9th the depression was central near Marquette, Michigan, having moved in a northeasterly direction from Minnesota. It continued its northeasterly course, and at midnight of the 9th it was central some distance north of Father Point, Province of Quebec; from that point it cannot be further traced.

VI.—This weak depression developed in Indiana during the afternoon of the 13th, and was then central near Indianapolis. It moved rapidly northeastward, accompanied by rain, and strong northerly winds prevailed on the lower lakes. The morning report of the 14th showed the area to be central in Maine. At this hour high southerly winds prevailed on the coasts of New England and New Jersey. Rain fell in all districts from the Missouri valley eastward, including the Gulf states. The depression disappeared beyond the limits of the chart on the 14th, passing over the Gulf of Saint Lawrence and New Foundland.

VII.—The midnight report of the 15th showed the pressure to be .17 of an inch below the normal at Yuma, Arizona Territory. Light rain had fallen in Utah, Arizona, and western Texas. During the 16th the depression moved northeastward and at midnight was central in Colorado. The rain-area extended from the Mississippi river to the Sierra Nevada mountains, and high winds prevailed in the Missouri valley and adjacent territories. As the depression continued its northeasterly course the winds on the upper lakes increased in force, blowing with considerable violence on the 17th and 18th. On the morning of the latter date the centre of disturbance was in Manitoba, and during the day passed into British America. Numerous newspapers commented upon the intensity of the storm, particularly on Lake Michigan. But few casualties are reported, as the vessels generally remained in port. Rain fell in nearly all districts during the passage of this area.

VIII.—The afternoon report of the 24th showed the development of a weak depression in Arkansas. The area moved northeasterly, and on the morning of the 25th was central over Lake Erie. Light rains had fallen in all districts. This depression instead of increasing in energy on reaching the lake region, as is usual, diminished considerably after the 25th and altered its course to a more easterly direction. On the morning of the 26th it was central near Buffalo, New York. At midnight its centre was off the coast of Maine, and by the afternoon of the 27th, disappeared off Nova Scotia, still continuing its easterly movement. The lowest barometer observed was 29.85 inches at Cleveland, Ohio, at midnight of the 25th.

IX.—The pressure at midnight of the 28th was .58 of an inch below the normal at Saint Louis, Missouri. At the same hour a depression was central in the Saskatchewan valley, apparently moving eastward. The latter disturbance was last observed in Manitoba on the morning of the 29th. Owing to absence of reports from the territory north of Lake Superior, it cannot be determined whether number ix. united with this area, or a portion of it, on the afternoon of the 29th near Lake Huron, or not. The depression in Missouri moved northeasterly increasing in energy, and was central on the morning of the 29th in northern Indiana. During the afternoon it developed into a storm of great energy, central over Georgian bay, the barometer at Saugeen reading 29.18 inches. Westerly winds prevailed on the Lakes and the pressure rapidly increasing in rear of the storm, the winds increased in force, blowing with a velocity from twenty-five to thirty-six miles an hour. General rains fell in all districts east of the Missouri valley. The disturbance followed the course of the Saint Lawrence river, accompanied by high winds, and on the morning of the 30th was central near Quebec. It disappeared on the 31st, moving in a northeasterly direction. Severe gales also occurred on the Atlantic coast during the passage of this area. The lowest barometer observed was 28.87 inches at Anticosti Island, Gulf of Saint Lawrence, on the 30th.

NORTH ATLANTIC STORMS DURING OCTOBER, 1883.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during October, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic, and from other miscellaneous data received at this office up to November 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich mean time.